FINAL YEAR PROJECT REPORT

ADVANCED DIPLOMA IN MECHANICAL ENGINEERING

SCHOOL OF ENGINEERING

MARA INSTITUTE OF TECHNOLOGY (ITM)

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THE STUDIES OF COGENERATION SYSTEMS

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NOVEMBER 1995

SUMMARY

The purpose of this studies is to understand the potential for energy saving through this cogeneration schemes. This studies start with the thermodynamic of cogeneration power plants which differentiate the conventional power plant thermodynamic analysis from cogeneration plant and review examples of cogeneration plant, develop thermodynamic criteria of performance and give example of their use.

The results briefly outline the criteria of the thermodynamic performance, its overall efficiency, heat to power ratio, energy utilisation factor (EUF) and fuel energy saving ratio (FESR). These analyses lead to the best choice of the type of plant for a given heat to power demand. These results also consider the overall performance of "matched" and "unmatched" plant and make comparison on performance criteria for certain plants related to the other in term of heat to power demand. This later develop the choice of design parameters within the cogeneration plant itself.

A few case studies on the cogeneration plants that exist worldwide highlight the type of heat processing and also the saving of fuel and the percentage of energy being utilised compared to the conventional type. It also shows how the demand changes (λ_D) can effect the entire plant.

The cogeneration schemes (micro) that is being use in the commercial sectors, describe the design criteria and its typical application. The result also explain the different type of generator operation in conjunction with the national grid, the heat recovery system and how this micro-cogeneration is becoming more common in Europe.

The economic consideration underline the main factors which can effect the operational economic of cogeneration plant. It also give some method of viability assessment (NPV method) and the pay back period consideration.

The development of cogeneration in Malaysia and the potential of this cogeneration in this country is being highlighted. It also outline the government plan to emphasises diversification of energy mix, to achieve self-sufficient , reduce dependence on oil and to optimise utilisation of nation's natural gas resources and finally this report covers our proposed project on cogeneration, and we proposed that the heat is being processed for air conditioning by introducing Lithium Bromide absorption chillers.

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